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## A New Chorus Frog (*Pseudacris*) from the Eastern United States

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Although Cope assigned to the chorus frog of New Jersey a *nomen nudum* (*Chorophilus triseriatus*, subspecies *corporalis*) as long ago as 1875, it has continued for the ensuing 80 years to be catalogued under the names of either *triseriata* or *feriarum*, with either specific or sub-specific rank. As long ago as 1941 I became convinced that it was sufficiently distinct from other members of the genus to be named, and I drew up a description accordingly. This description has been revised in 1947 and again in 1955.

### *Pseudacris nigrata kalmi* subsp. nov.

Kalm's Chorus Frog

*Type.* Carnegie Museum No. 33917 ; adult male ; Centreton, 2 5 miles northeast of Moorestown, Burlington County, New Jersey; collected March 19, 1936, by Roger Conant and Joseph M. Cadbury.

*Subspecific characters.* Most closely resembling *P. n. triseriata* (Wied) , of the upper Mississippi Valley and Great Lakes region, rather than the geographically nearer *P. n. feriarum* (Baird) , of the Piedmont, Blue Ridge, and Valley and Ridge Provinces (Fenneman, 1930) . More robust than either, as represented by specimens of *triseriata* from western New York and central Illinois and of *feriarum* from Cumberland County, Pennsylvania (from which the latter subspecies was described) ;

\*115 Ridgway St., Mount Holly, N. J.

<sup>1</sup>In commemoration of Peter Kalm (1716-1779) , the accomplished author of *Travels in North America* (1753-1761) and a pioneer student of frogs in New Jersey.

<sup>2</sup>Centreton is on the south side of Rancocas Creek; it appears under this name on atlas sheet No. 31 of the Department of Conservation and Development, State of New Jersey (194-2). The same locality is designated as Bougher on the Mount Holly quadrangle of the U. S. Geological Survey (1898). There is a Centerton (note spelling) in Salem County, New Jersey. [Roger Conant]

Virginia) ; also the Triassic Lowlands of the Piedmont Province in northern New Jersey and extreme eastern Pennsylvania (Fenneman, 1930).

*Remarks.* The *Pseudacris nigrita triseriata-feriarum-kalmi* group exhibits very considerable variation in both measurements and color pattern. In discriminating the subspecies, or in comparing one population with another, it has been found advisable to place chief dependence on

**Table I. Average measurements of adult males of *Pseudacris nigrita* subsp.**

Locality	No. of Dates specimens averaged		Length mm.	Elbow to tip of 3rd finger	Inter- genual extent	Tibia	Whole hind foot
<i>Pseudacris nigrita kalmi</i>							
New Jersey:							
Bergen Co., Oradell	3	5/6	28.2	12.5	22.7	12.7	21.8
Morris Co., Chatham	3	5/23	26.3	11.7	23.0	12.7	21.0
Burlington Co., Centreton	4	3/19;4/22	27.3	11.8	22.6	12.1	20.6
Camden Co., Atco Lake	4	3/5	28.9	12.5	23.5	12.8	22.1
Camden Co., Bishops		3/5	29.8	12.6	24.7	13.2	22.3
5 Cumberland Co., Bridgeton, Cumberland, and Hunter's Mill			29.2	12.7	23.4	12.9	21.8
		3/27,28					
10 Pennsylvania:							
Bucks Co., Tullytown		4/28	26.2	11.3	22.0	12.2	20.5
3 Montgomery Co., Sumneytown	9	4/5	28.6	11.9	24.2	13.4	21.3
Virginia:							
Accomac Co., 4 localities	5	4/8-5/20	27.8	11.5	22.3	13.0	20.6
<i>Pseudacris nigrita feriarum</i>							
Pennsylvania:							
Berks Co., Joanna	2	5/3	26.8	11.5	23.0	13.0	20.6
Cumberland Co., 3 localities	6	4/20,21	26.5	11.5	23.1	12.9	19.6
South Carolina:							
Greenville Co., Greenville	3	March	26.8	11.8	23.8	13.7	20.8
<i>Pseudacris nigrita triseriata</i>							
New York:				11.6	21.1	11.7	20.1
Monroe Co., Rochester	7	3/22;5/11	26.1				
Illinois:							
Cass Co., Chandlerville	4	3/29	28.4	11.9	22.0	11.4	20.6
Sangamon Co., Springfield	4	4/5	27.6	12.1	21.8	11.6	21.0
Cumberland Co., Greenup	3	3/6	26.8	12.0	21.7	11.5	21.0

the larger individuals and on those that are most clearly striped. Consequently, the adult males, whose average measurements are presented in Table I, were selected out of a larger number that included some of lesser size. It may be suspected that the smaller individuals represent yearlings, and the larger ones, those that are one or more years still older. Females have measurements averaging about 10-20 per cent

dorsal surface smoother, less granular ; dorsal stripes generally more clearly defined ; areolae of under parts generally not extending so far along the femur. In comparison with *triseriata*, hind limbs longer, and ventral areolae more conspicuous. In comparison with *feriarum*, dorsal stripes broader and more continuous (less often broken up into spots) .

*Description of type.* Dorsal ground color Smoke Gray<sup>3</sup>; three clearly defined dorsal stripes Dark Olive-Gray, averaging about 2 mm. in diameter ; the median one extending from in front of eyes to vent, and expanded between eyes into a distinct triangular blotch that extends on to eyelids ; the two paired stripes extending from nape nearly to groin, and slightly divergent anteriorly ; a lateral stripe of the same color extending from tip of snout to eye, continuing behind eye, across tympanum, and along the side nearly or quite to groin, becoming 3.5 mm. wide on side, and changing to brownish on and near tympanum ; an Ivory Yellow maxillary streak, about .5 mm. wide, contiguous with lateral stripe on its lower side from tip of snout to arm insertion, and bordered below (along the upper jaw) with a dusky streak of about the same diameter ; upper surface of limbs, including fingers and toes, finely spotted or obscurely barred or blotched with Dark Olive-Gray ; areas of similar color, mottled with lighter, extending along anterior side of femur, outer side of tibia, and outer ventral side of tarsus and toes ; under side of limbs flesh-colored ; areolae of Cream Color, with a maximum diameter little more than .5 mm., covering the ventral parts from posterior throat to proximal part of femur ; anterior throat dusky; a dusky speckling extending across mid-abdomen ; a slight pectoral fold.

*Measurements.* Adult male type : length 28 mm.; elbow to tip of third finger 11.5 ; intergenual extent 23 ; tibia 12; whole hind foot 21. Other adult males attain lengths of 29.5 (Oradell, N. J.) , 30 (Atco Lake, N. J., and Sumneytown, Pa.) , 31.5 (Bridgeton, N. J.) , and 32 (Bishops and Hunter's Mill, N. J., and Nassawadox, Va.) .

The average and extreme measurements of four adult females from New Jersey (Centreton, Tomlinton's Mills, and Bishops) are: length 32.9 (29-36) ; elbow to tip of third finger 13.9 (12.5-15) ; intergenual extent 26.5 (23-28.5) ; tibia 14.8 (13-16) ; whole hind foot 25.3 (22.5-27.5).

*Distribution.* Coastal Plain region of Staten Island (New York) , New Jersey, extreme southeastern Pennsylvania, and the Delmarva Peninsula (Delaware and the Eastern Shore counties of Maryland and

<sup>3</sup>Capitalized color terms derived from Ridgway, *Color Standards and Color Nomenclature* (1912).

greater than those of the males ; they are essentially similar in color pattern, but their areolae cover practically the entire throat instead of being restricted to the posterior half, as in the males.

In comparison with *feriarum* and *triseriata*, *kalmi* is a somewhat more robust frog than the linear measurements would indicate. It has a definitely longer hind limb than *triseriata*. The dorsal stripes in *feriarum*, besides being generally discontinuous or broken up into spots, are narrower (less than 1 mm. in width) and more weakly developed than in the other two subspecies. In many specimens of *kalmi* the median dorsal stripe has a pronounced posterior bifurcation.

The restricted type locality of *Hyla triseriata* Wied (1839) is the area between Rush Creek and Big Creek, Posey County, extreme southwestern Indiana (Harper, 1955) . As pointed out by Smith and Smith (1952: 176) , specimens from this locality are "definite intergrades which . . . approach *triseriata* more closely than *feriarum* in the character of leg length and dorsal pattern." The Illinois specimens of *triseriata* whose measurements appear in Table I were collected in localities not far from the center of that state, and are doubtless more typical representatives of that subspecies than topotypes from Posey County, Indiana.

A considerable proportion of the specimens of *kalmi* exhibit, on the light ground color between the dark dorsal stripes, faint intermediate or "shadow" stripes ; in some cases these have a slight reddish brown tinge, while in others they take the form of a series of obscure little dots. In some specimens the dorsal stripes almost or entirely disappear, or they may be replaced by an irregular array of small spots (say .5 to 1 mm. in diameter) . A minority of the specimens have a few dusky spots on mid-abdomen or sides.

The specimens from northern New Jersey, in the Triassic Lowlands of the Piedmont, exhibit, as might be expected, a certain amount of variation in color pattern from Coastal Plain specimens. The dorsal stripes tend to become broken, and in some cases coalescence takes place between the median and an adjoining stripe. In a series of 15 specimens from the vicinity of Sumneytown, Montgomery County, in the Piedmont of Pennsylvania, a considerable proportion are strongly striped and appear to be indistinguishable from northern New Jersey specimens of *kalmi*. A few, however, can not be definitely separated from *feriarum* on any color character ; these can scarcely be matched by any individuals from the Coastal Plain of New Jersey or the Delmarva Peninsula. The variant Piedmont specimens may represent an approach toward, or a sort of intergradation with, *feriarum*.

The stripe through the eye in *feriarum*, as compared with that in *kalmi*, does not commonly extend as a very distinct mark past the arm

and to the middle of the side. Greater width of the light maxillary streak is a frequent, but not invariable, character in the former. The paired dorsal stripes, as a rule, are widely divergent anteriorly in *feriarum*, but no more than slightly divergent in *kalmi*. The interorbital spot is generally indistinct, incomplete, and less extensive (if present at all) in *feriarum*; and the limbs are generally much less distinctly spotted or barred. The dusky stripe along the outer edge of the tibia (generally evident in *kalmi*) is much less distinct, if evident at all, in *feriarum*.

*Specimens examined.* NEW JERSEY: *Bergen Co.*—Oradell 6. *Morris Co.*—Chatham, 2 mi. s.e. 6. *Burlington Co.*—Centreton 6; Tomlinton's Mills 10. *Camden Co.*—Atco Lake 8; Bishops 8. *Cumberland Co.*—Bridgeton 5; Cumberland 5; Hunter's Mill 1.

PENNSYLVANIA: *Bucks Co.*—Tullytown, 1 mi. e. 5. *Montgomery Co.*—Sumneytown 15.

DELAWARE: *Sussex Co.*—Angola, 1 mi. n.n.w. 1.

VIRGINIA: *Accomac Co.*—Accomac, 2 mi. s. 2; Keller, 1 mi. s. 1; Locust-vine 1; Onancock, 3 mi. s. r. *Northampton Co.*—Nassawadox 1.

The greater number of these specimens were among Roger Conant's material; the remainder, among my own. The following paratypes have been deposited in the Chicago Academy of Sciences: NEW JERSEY: *Burlington Co.*—Centreton 2 (16635-6) ; Tomlinton's Mills 10 (16637-46). *Camden Co.*—Atco Lake 8 (16647-54.) ; Bishops 8 (16655-62).

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